

OBSERVATIONS ON THE GREAT LAKES.

REPORTS FROM U. S. LIFE-SAVING STATIONS.

Through the co-operation of the General Superintendent of the Life-Saving Service and the Secretary of the Treasury, the Weather Bureau has received monthly reports for the

month of September from the keepers of 40 U. S. Life-Saving Stations on the Great Lakes.

REPORTS FROM VESSELS.

The Lake Marine Section of the Forecast Division has received 68 reports from vessels navigating the Great Lakes.

SUNSHINE AND CLOUDINESS.

GENERAL REMARKS.

The quantity of sunshine, and therefore of heat, received by the atmosphere is a fundamental factor in meteorology; the quantity received by the atmosphere as a whole is very nearly constant from year to year, but the proportion received by the surface of the earth depends largely upon the absorption by the atmosphere and varies with the distribution of cloudiness. The sunshine is now recorded automatically at about 39 regular stations of the Weather Bureau, either by its photographic or its thermal effects. The cloudiness is recorded by personal observations at all stations and is given in the column of "average cloudiness" in Table I.

SUNSHINE.

An instrumental record of sunshine has been kept during the month at 18 stations by means of the photographic sunshine recorder and at 21 stations by means of the thermometric sunshine recorder; the results of these observations are given in Table IV, for each hour of local mean time (not seventy-fifth meridian time). The stations recording the largest percentages of sunshine between the hours of 11 a. m. and 1 p. m. were: Tucson and San Francisco, 94; New Orleans and Vicksburg, 92.5; Detroit, 92; St. Louis, 89. The stations having the least percentage between these hours were: Portland, Oreg., 49; Savannah, 51; Spokane, 55; Rochester, 57.5; Eastport, 58; Baltimore, 60; Wilmington, 61; Bismarck, 66.5.

The general average percentage for the whole month is given in the next to the last column of Table IV. The highest percentages were: Tucson, 89; Santa Fe, 82; New Orleans and Salt Lake City, 80. The lowest percentages were: Eastport, Portland, Oreg., and Rochester, 44; Wilmington, 47; Savannah, 53.

CLEAR SKY.

The average cloudiness between sunrise and sunset, as based on numerous personal observations, is given for each Weather Bureau station in Table I; the complement of this average

cloudiness gives the observer's estimated percentage of clear sky and these latter numbers are given in the last column of Table IV.

COMPARISON OF SUNSHINE AND CLEAR SKY.

The sunshine registers give the duration of direct sunshine whence the percentage of possible sunshine is derived; the observer's personal estimates give the percentage of area of clear sky. It should not be assumed that these numbers should agree, and for comparative purposes they have been brought together, side by side, in the following table, from which it appears that, in general, the instrumental record of percentages of duration of sunshine is almost always larger than the observer's personal estimates of percentages of area of clear sky; the average excess for this month is 8 per cent for photographic records and 11 per cent for thermometric records:

Difference between instrumental and personal observations of sunshine.

Photographic stations.	Instrumental.	Personal.	Difference.		Thermometric stations.	Instrumental.	Personal.	Difference.
Tucson, Ariz.	89	75	14		New Orleans, La.	80	79	1
Santa Fe, N. Mex.	82	77	5		Salt Lake City, Utah	80	70	10
San Francisco, Cal.	77	79	-2		Colorado Springs, Colo.	78	69	9
Denver, Colo.	76	63	13		St. Louis, Mo.	76	65	11
Dodge City, Kans.	76	68	8		Vicksburg, Miss.	76	74	2
Cincinnati, Ohio.	74	58	16		Detroit, Mich.	75	62	13
Kansas City, Mo.	70	56	14		Key West, Fla.	73	42	31
Cleveland, Ohio.	66	57	9		Chicago, Ill.	70	60	10
Galveston, Tex.	64	64	0		Columbus, Ohio.	70	60	10
Memphis, Tenn.	64	64	0		Louisville, Ky.	64	46	18
San Diego, Cal.	64	54	10		Little Rock, Ark.	63	49	14
Bismarck, N. Dak.	63	63	0		Buffalo, N. Y.	60	41	19
Helena, Mont.	62	51	11		Philadelphia, Pa.	60	41	19
Washington, D. C.	59	53	6		New York, N. Y.	59	45	14
Spokane, Wash.	57	35	22		Boston, Mass.	58	42	16
Savannah, Ga.	53	47	6		Baltimore, Md.	57	46	11
Eastport, Me.	44	35	9		Portland, Me.	54	37	17
Portland, Oreg.	44	38	6		Wilmington, N. C.	47	51	-4
					Rochester, N. Y.	44	56	-12
					Des Moines, Iowa.	44	54	-10
					New Haven, Conn.	46	46	0

NOTES BY THE EDITOR.

STUDIES ON HURRICANE WINDS AND HIGH WATERS.

The phenomena attending the high water at Charleston, S. C., during the hurricane of September 26, are presented graphically on Chart VI of this REVIEW, as prepared by Gen. E. P. Alexander, of South Island. It will be seen that the records of the self-registering tide gauge show that on the morning of the 25th, and at the close of the 27th, when the winds did not exceed 25 miles per hour, the normal tide and the actual stage of the water agreed closely, but that on the 25th, at noon, when the northeast winds were 24 miles, the water began to rise above its normal height, reaching a maximum at 6.30 p. m. of the 26th, when it was 4.7 feet above the normal, after which it diminished until, on the 27th, at 7 p. m., when the wind was west or northwest, 20 miles, the water had again returned to its normal condition. If we make

allowance for the normal tide it will be found that, owing to the retardation in the movement of the water, the excess of the actual above the normal was a minimum, viz, 1.4 feet from 1 to 3 p. m. of the 26th, after which it increased to 2.0 feet at 5 p. m.; 5.0 at 7 p. m.; 5.1 at 8 p. m.; 4.9 at 9 p. m.; 4.7 at 10 p. m.; 5.0 at 11 and 12 p. m., at which time the central lowest pressure passed over Charleston, and the east wind diminished rapidly before shifting to southwest.

DISTANT STORMS INDICATED BY TIDES AT NEW YORK.

Capt. Edmund Jones who, for many years, kept logs of deep water voyages for Lieut. Maury, and who now lives at Cold Spring Harbor, Suffolk Co., N. Y., states that in connection with a cyclonic storm experienced by the steamship *Italia*, on September 8, in N. 42° 30', W. 41° 05', he made the following observations: